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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR JUNE 1937

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F. A. REYNOLDS RETIRES

Frank A. Reynolds, auditor in the fiscal and budget section of the Bureau, retired on June 30, 1937, on account of disability. Mr. Reynolds entered the service of the Department in 1902 as a clerk in the Bureau of Soils and came to the Bureau of Entomology in 1925. Since that time he has been engaged in auditing work in the Bureau of Entomology and the present Bureau of Entomology and Plant Quarantine. Throughout his service his official associates found him to be not only a conscientious and efficient auditor but one whose broad interests and sympathies contributed greatly to the morale of his organization.

A NEW WEEVIL IN THE SOUTHEAST

Last summer a new weevil was found in Covington County, Ala., and Walton and Okaloosa Counties, Fla., established over an area of probably not more than 35 square miles. This weevil was determined as Naupactus leucoloma Boh., a native of Argentina, Chile, and Uruguay. It has also been introduced into Australia. In the United States this insect has already destroyed fields of peanuts, cotton, corn, velvetbeans, Irish potatoes, and sweetpotatoes, and is known to attack a wide variety of other garden crops. It does most of its damage in the larval stage where the grubs feed extensively on the roots of plants. The adult beetles, which cannot fly and are, so far as is known, all females, come out of the ground in enormous numbers in late June and feed on the foliage of a variety of plants before they commence to deposit eggs in the soil. Forty Federal and State inspectors are now in the infested area carefully scouting to determine the limits of distribution. Repressive measures, which consist of hand picking, poisoning, and constructing trench barriers to prevent spread, are being carried on.

NICARAGUAN LOCUST TAX

A Managua, Nicaragua, cable to the New York Times says that, at the request of the Nicaraguan Minister of Agriculture, Congress is engaged in enacting a tax of 40 cents each on the male inhabitants of the republic between the ages of 18 and 60, to raise money to combat the locust plague, which threatens to wipe out the cereal and other crops and which is destroying much vegetation. A tax of 1 cordoba per 1,000 cordobas has been declared on capital for the same purpose.

FRUIT INSECT INVESTIGATIONS

Dichlorethyl ether dissolved in water effective against larvae of plum curculio in soil.--Oliver I. Snapp and J. R. Thomson, Jr., of the peach-insect laboratory at Fort Valley, Ga., report that dichlorethyl ether dissolved in water at a rate as low as 10 cc per gallon of water is very effective against larvae of the plum curculio in the soil. Not a single individual reached the adult stage in the cages where 10 cc of dichlorethyl ether in 1 gallon of water per square yard of soil was used against the larvae. When used against the pupae in the soil, however, 10.6 percent of the pupae reached the adult stage when a stronger solution--33 cc per gallon--was used. Seventy-seven percent of the individuals placed on the check soil emerged as adults, which indicates that favorable conditions for rearing were maintained in the medium in which these experiments were conducted.

Influences controlling spring populations of dried fruit beetle.--Census trapping of Carpophilus hemipterus L., using traps baited with fermenting dried peaches, have been carried on by Dwight F. Barnes, of the Fresno, Calif., laboratory, during the last seven springs. Although measurements of populations entering hibernation are lacking, the trap catches show relationships between over-winter survival and weather. Accumulated departures from normal rainfall and temperature, from November through April, and the catches of beetles in March, April, and May have been compared by Mr. Barnes. In addition to the years 1931-37, there are records of heavy infestations in the springs of 1928 and 1930, making a total of 9 years available for study. The 5 years of lightest rainfall from November through April were associated with above-normal survival. The five November-April periods when monthly mean temperatures were highest were associated with survival of more than the average number of beetles. The lightest spring population, that of 1937, followed a cold, wet hibernation period; the heaviest survival, in 1928, was correlated with dry, mild weather during the preceding winter and early spring.

Emergence of Japanese beetle.--T. H. Dobbins reports that the first field find of the Japanese beetle in the vicinity of Moorestown, N. J., was on June 14. Occasional beetles have been reported a few days earlier from protected places, but the June 14 find is considered as representing average field conditions. Thereafter, emergence continued rather more slowly than usual, as a result of the comparatively cool, cloudy weather until toward the end of the month, when the beetles were to be found locally in abundance.

Overwintering of Japanese beetle in New England.--I. M. Hawley, of the Springfield, Mass., sublaboratory, reports having found a few Japanese beetle eggs in plots at Keene and Concord, N. H., during examination of the plots early in June. None of the eggs hatched, however. The surveys showed that eggs deposited late in the preceding season failed to survive the winter, even though it was extremely mild and lacked the usual snow cover. It also appears that larvae entering hibernation as newly hatched first instars also failed to survive the winter.

Asiatic garden beetle parasite recovered.--J. L. King and L. B. Parker, of the Japanese beetle laboratory, Moorestown, report the recovery of *Tiphia sternata* Parker, an imported parasite of *Autoserica castanea* Arrow. The first colonies of this species were released in 1933. This is the first recovery made of the species, although the recovery is from a release made in 1936.

Hymenopterous parasite of Japanese beetle becoming established.--At the Japanese beetle laboratory at Moorestown, J. L. King, T. R. Gardner, L. B. Parker, and M. H. Brunson liberated 154 colonies of *Tiphia vernalis* Roh., an imported parasite of the Japanese beetle, in New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia late in May and early in June. This material was collected from five established colonies near Philadelphia, Pa. Recovery scouting showed that the parasite was established at at least 100 of the liberation sites, indicating an establishment of at least 65 percent.

MEXICAN FRUIT FLY CONTROL

The situation in the lower Rio Grande Valley.--The taking of the citrus census was completed in a few districts and is rapidly drawing to a close in others. Unusually hot and dry weather has retarded the development of fruit in some sections. Growers have had to irrigate their groves in order to keep much of the young fruit from dropping. Rust mites are active throughout the area. The number of adult *Anastrepha ludens* trapped in Texas decreased from 878 in May to 41 in June. All but four of these flies were taken before June 15. The numbers of adult fruit flies of all species trapped in Texas in June were as follows:

Anastrepha ludens Loew	41
Premises	29
A. serpentina Wied.	9
Premises	9
A. acidusa Walk.	2
Premises	2
A. pallens Coq.	490
Premises	145
Toxotrypana curvicauda Gerst.	1
Premises	1
Total	543

No fruit fly larvae were found.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Chinch bug not especially partial to any one kind of small grain.--C. M. Packard, Lafayette, Ind., reports that infestation in general is light in East Central States as a result of high winter mortality and a cool, wet spring. Two months' observations in south-central Illinois agreed with those of past 3 years. No single kind of small grain is sufficiently more attractive than the others to bugs leaving hibernation to serve effectively as a trap crop. Attractiveness to the old bugs depends fully as much on thinness of stand as on kind of grain. The elimination of all small grains, except perhaps oats, would be necessary to effective reduction of the spring brood in a neighborhood, and even then under some conditions considerable infestation would be likely to develop in some oat fields.

Cotton seed hulls make good bait for armyworm.--C. M. Packard, Lafayette, reporting on the course of the extensive outbreak observed in Mississippi, Arkansas, Oklahoma, and south-central Illinois, says that airplane dusting was successful where thorough coverage with calcium arsenate at 15 to 30 pounds per acre was obtained. Standard poisoned-bran bait was used on a large scale with excellent results where properly applied. In experiments cottonseed hulls and alfalfa meal were fairly good substitutes for wheat bran, but required the addition of molasses, which greatly increased their efficiency. Pure wheat bran was highly efficient without molasses. Sawdust alone did not make an attractive bait but could be used up to half-and-half with more attractive carriers with fair success. Sodium arsenite was superior to white arsenic or paris green as a poison.

Corn earworm more abundant this year in Illinois and Missouri.--R. A. Blanchard, Urbana, Ill., reports that only one adult (found at Charleston, Mo.) was obtained from the four sets of hibernation cages under observation in Illinois and Missouri. Heaving of the soil plus large amounts of rainfall are two probable reasons for this condition. Notwithstanding the lack of emergence from the hibernation cages the earworm has appeared much earlier and in greater abundance than last season. A number of living pupae were found in dry, sheltered areas around the cannery buildings at Hoopeston, Ill., one area where considerable early infestation has occurred. Several examinations of green corn shipments by rail from the South were made at St. Louis and Chicago. Large numbers of full-fed larvae were found below the false floors of the cars after they were unloaded. In case cars are left standing in freight yards for sufficient periods they may offer a source of early infestation in areas north of the natural limits of Heliothis obsoleta. Green corn containing large H. obsoleta larvae was observed in the markets at Urbana and Champaign by May 26, 1937.

Alfalfa weevil conditions and control.--J. C. Hamlin, Salt Lake City, Utah, reports that cultural control experiments at Medford, Oreg., demonstrated that clipping immature first growth is valueless and that early cutting is a practical control in favorable weather.

JAPANESE BEETLE CONTROL

Large-scale fumigation of empty refrigerator cars.--From 200 to 400 empty refrigerator cars have been fumigated daily at the Banks, Farnhurst, and Porter, Del., sidings of the Pennsylvania Railroad since June 15, the effective date of the season quarantine on fruits and vegetables. At these sidings 3,652 cars were fumigated from June 15 to June 30. These cars comprise all empty refrigerator cars moving into the Del-Mar-Va peninsula. Practically all of the cars are used for the movement of the Eastern Shore potato crop. Fumigation of all empty cars and loading of the potatoes under the supervision of an inspector make it possible to issue a certificate for each car. This work was organized at the request of the railroad officials. Bureau inspectors check the temperature of the interior of each car and observe that the drain plugs are plugged and all doors and hatches are closed before the car is fumigated. There are 20 temporarily employed inspectors supervising the fumigations. The fumigant is purchased by the railroad, and railroad employees perform the fumigation operations. Railroad employees, as well as our inspectors, are provided with gas masks. Application of the fumigant has been reduced to a comparatively simple operation, involving much less hazard to the operators than when liquid hydrocyanic acid was forced from tanks into small cans set in shallow pans hung from the hatchways. Now paper discs approximately 3 inches in diameter and 1/8 inch thick, impregnated with the required dosage of HCN, are supplied in sealed cans. Twelve of these discoids are strung together on a string about 5 feet long, each disc hanging separately. Two series of discs are packed in one can. Together these contain 6½ ounces of the fumigant, sufficient for fumigating one car. A special type of can opener is used to open the cans and a string of discoids is suspended from one of the bunker doors at each end of the car. Drips from the bunker pans are plugged with waste prior to fumigation, and the hatches are closed immediately after the string of discoids has been suspended. Both doors are sealed with "USDA" seals after fumigation. At the end of the 2-hour fumigation period the hatch plugs are removed and screens are placed over the hatch openings to prevent reinfestation of the car. Such cars are opened only while being reiced en route to destination. The railroad is employing 120 men in connection with the cleaning of refrigerator cars and their fumigation at the sidings near Wilmington. In addition to the Bureau's inspectors at these sidings, there are 35 inspectors scattered among as many loading points on the Eastern Shore to prevent the infestation of cars during loading. In the Philadelphia area empty refrigerator cars were thoroughly inspected from June 15 to 27. Screening was required after June 21 and fumigation of empty cars was started by the railroad companies voluntarily on June 28. Fumigation of loaded cars will start as soon as the adult beetles become numerous enough to warrant this procedure.

Japanese beetle emergence.--Adult beetles were first observed in the Richmond, Va., district on June 3, and 70 beetles were collected at the pump house along the James River on June 4. Reports of beetle emergence in the Philadelphia district were received during the week beginning June 7. Adult beetles appeared in the Harrisburg, Pa., district the week beginning

June 21. The earliest reported collection of an adult in northern New Jersey was on June 22. Early infestation of farm products was evidenced by the finding late in the month of 24 Japanese beetles in 3 shipments of New Jersey beans inspected at Boston for consignment to nonregulated territory in Maine. Emergence at Glen Falls, N. J., was reported on June 29. Twenty-five traps were set in South Boston on June 29 and June 30, to indicate the first emergence of the insect in that section. Three beetles were trapped on July 1. Few beetles have emerged in the Philadelphia district. A heavy emergence is in progress in the metropolitan New York area. A crew member of a steamship docking at Chester, Pa., on June 27 advised the maritime inspector that the crew did not see any Japanese beetles flying over Delaware Bay until they had passed Claymont, Del. Only a few adults were observed in flight. An exceptionally heavy flight of the beetle in Washington, D. C., is also reported.

New Jersey inspection activities.--Very few beans and peas have been presented for inspection in the South Jersey district. Poor weather and failure to control insects and diseases resulted in many crop failures. Usually a dozen or more inspectors are kept busy inspecting and certifying beans and other farm products moving from the Glassboro district. During the latter half of June, certifications in the Glassboro district were limited to two carloads and two truck loads of beans. In the Trenton district, 20 carloads and 1 truck load of beans and 1 truck load of cabbage were inspected, and 20 empty refrigerator cars were fumigated. Fumigation of blueberries at the New Lisbon fumigation house of the Blueberry Growers Association is scheduled to begin about July 4. Applications of additional dosages of lead arsenate to bring the concentration up to 1,500 pounds per acre were made by June 30 in nurseries maintaining certified heeling-in areas.

Seasonal quarantine activities.--Demands for inspection and certification of fruits and vegetables during the seasonal quarantine on these commodities starting June 15 were met by the establishment of 39 inspection centers in all principal market areas within the regulated area. Scouting of heretofore uninfested classified nurseries and greenhouses was started in Virginia, Maryland, and Delaware on June 17. The first scout find on a classified nursery was made in the Richmond district on June 17. Several first-record nursery infestations were reported later in the month from the Baltimore and Salisbury, Md., and the Exmore, Va., districts.

Nurseries scouted for gypsy moth.--Scouting for gypsy moth infestation in nurseries located in the lightly infested area in Connecticut was performed in June. Scouts concentrated particularly on the blue spruce and deciduous plantings and on trees bordering the premises. These nurseries were all found to be free from infestation. Very few larvae of any species were found. These uninfested nurseries will be entitled to gypsy moth certification for all their stock without the customary inspection between digging and shipping. Later, if the nurseries are found to be free from Japanese beetle infestation, they will be entitled to joint certificates under quarantines 45 and 48.

Larval infestation in inspected shipments.--Among shipments presented for gypsy moth inspection and certification during the month were 11 consignments, mostly of lumber, on which were found 76 gypsy moth larvae. Seven of the infested shipments were examined at Deering Junction, Maine. The largest number of caterpillars found on a single shipment totaled 40 larvae taken from a carload of lumber inspected at Ashland, N. H., for shipment to Lennoxville, Quebec.

Current Dutch elm disease activities.--By the end of June the scouting force had been increased to 3,159 men. Eradication-crew members numbered 667, and 753 men were working in sanitation crews. The total W. P. A. force on June 30 was approximately 4,300, and the grand total of all men engaged in Dutch elm disease eradication work was 5,300. During the month 13,033 specimens were collected from elms showing apparent symptoms of Graphium infection. Laboratory reports rendered included 1,340 positive cases of the disease and 5,426 miscellaneous cases. Eradication crews felled and burned 699 infected trees and sanitation crews removed 10,300 dead and devitalized elms. Activities of sanitation crews working in clear-cutting areas accounted for the removal of an additional 37,920 elms. Tree-medication crews treated 2,551 trees in areas to be made elm-free.

Dutch elm disease scout schools.--Scout schools were set up in New Jersey, New York, Connecticut, and Maryland early in June. Approximately 1,300 men were in training the first week in June. Difficulty was experienced in Connecticut and New York in obtaining referrals from the W. P. A. of men suitable for the duties required of a Dutch elm disease scout. All prospective scouts from sanitation crews already employed were transferred to the scout schools. Among the tests to determine physical fitness for this work are: Eye test, ladder climbing, rope throwing, and rope climbing. Other tests for adaptability include tree identification, identification of Dutch elm disease symptoms, map reading, and preparation of reports. Most of the scouts who completed their training satisfactorily were placed in the field during the week ending June 12.

Autogiro scouting.--During the week ending June 5, the autogiro unit engaged in inspecting elms along railroad rights-of-way completed a 1,260-mile strip along the following railroads: Southern Railroad from Chattanooga, Tenn., to Birmingham, Ala.; Louisville & Nashville Railroad from Birmingham, Ala., to Louisville, Ky.; and Illinois Central from Louisville, Ky., to New Orleans, La. Nine elms were sampled by the ground crews on the basis of observations made from the autogiro. The entire southern loop of railroad scouting was finished on June 28. Systematic scouting with another autogiro unit was started in New Jersey on June 10. On June 15 a second autogiro crew started scouting in New Jersey, and on June 17 a third plane started operations.

Decrease in 1937 June confirmations.--A decrease in Dutch elm disease cases discovered during June is indicated by scouting results. From June 1 to July 4, 1936, 14,331 suspects were collected and 1,533 confirmations reported. From May 31 to July 4 of this year, 13,177 suspects were collected and only 1,352 positive infections determined.

Indianapolis confirmations.--Dutch elm disease infection in six elms in Indianapolis was reported in June. The center of infection is in Crown Hill Cemetery.

FOREST INSECT INVESTIGATIONS

Destruction of Douglas fir buds reduces budworm outbreak.--J. C. Evenden, of the forest-insect laboratory, Coeur d'Alene, Idaho, reports that a marked reduction in the spruce budworm outbreak followed as a result of an abnormal botanical condition within the Douglas fir stands of the Cody Canyon, Shoshone National Forest, in the spring of 1936. Owing to an unseasonal climatic condition, from 90 to 95 percent of the new-growth buds on the Douglas fir trees were injured and failed to produce any new growth. Though these buds started to swell, they failed to open. This condition is believed to be the result of a few days of abnormally warm weather, followed by a period of below-zero temperatures. Very little new foliage was produced from these trees in 1936, which undoubtedly was responsible for a marked reduction in the spruce budworm outbreak. The examination of this area during the latter part of June indicated this reduction in the insect population but showed that the trees were recovering and had produced 1937 growth through adventitious buds.

Bark beetle parasite limited by bark thickness.--W. D. Bedard, Coeur d'Alene, in reporting on the abundance of beneficial insects under various environmental conditions, states that Coeloides dendroctoni Cush., a parasite of the mountain pine beetle, is seriously hampered by excessively thick bark. As this small braconid deposits its eggs through the bark on mountain pine beetle larvae, if the bark is thicker than the length of the female's ovipositor, oviposition is impossible. In the following table the average number of Coeloides per square foot is shown for different bark thicknesses.

Bark thickness	Available for oviposition: Trees	Available for oviposition: Bark	Coeloides emerging
Inches	Number	Square feet	Number
0.2-0.3	70	1,794	18.9
0.4-0.5	155	4,656	9.4
0.6-0.7	62	2,588	5.3
0.8-1.0	18	846	2.9

It is apparent that parasitization is decidedly reduced by the thicker bark. Oviposition in thick-barked trees is undoubtedly accomplished through the deep cracks between the bark plates.

The larch case bearer.--J. V. Schaffner, Jr., of the New Haven, Conn., laboratory, reports as follows concerning Coleophora laricella Hbn.: "Permanent sample plots were examined during June and collections for parasite recoveries were made at six of them. The defoliation of each numbered larch tree was estimated and the average for each plot is summarized and given below, with similar data for last year for comparison.

Locality	Average defoliation in-- 1937	1936
	Percent	Percent
Maine:		
Corinth	10	17
Sidney	64	32
Massachusetts:		
Lunenburg	42	39
North Andover	46	36
New Hampshire:		
Berlin	70	60
New York:		
Greenfield	20	28
Saranac	88	91
Vermont:		
Sharon	42	33

"In the sprayed plots at Sidney, Maine, and Sharon, Vt.", Mr. Schaffner says, "very good control was obtained and there is a considerable contrast between the sprayed trees and nearby trees not sprayed. The foliage on the sprayed trees is a deeper green and the needles are longer. Moths began issuing on June 5, the maximum issuance being about June 10, and some parasites are still issuing. In and around the plot at Saranac, N. Y., at least 25 percent of the larch trees have died since 1935."

Pine sawfly prevalent in Massachusetts.--Mr. Schaffner also reports: "An extensive survey made in June revealed that the sawfly *Neodiprion* sp. was prevalent in red pine plantations in Middlesex and Worcester Counties, Mass. It was also found in one natural stand of red pine at Groton, Mass. Large-scale spraying operations were conducted on watersheds and private property to prevent serious defoliation."

Dendroctonus piceaperda Hopk. in Vermont.--Mr. Schaffner reports as follows concerning *D. piceaperda* on the Green Mountain National Forest: "Most of the hibernating adults had issued and were making new galleries or laying eggs in green trees on June 19. No hatching was observed on that date. A small percentage passed the winter in the larval stage and these were transforming to adults. Fresh pitch tubes and borings were noticeable, especially on trees on the slopes. In the periphery of the heavily infested area the large living and dead spruce were counted in five 1/5-acre plots taken at random. Of a total of 101 trees, 48 were dead."

Parasites of European pine shoot moth received.--P. B. Dowden and P. A. Berry, New Haven, report that during June the following parasite material of *Rhyacionia buoliana* Schiff. was received from W. F. Sellers, Wageningen, Holland: Hymenopterous cocoons, 2,700; tachinid puparia, 302; host larvae parasitized by Copidosoma, 6,483.

Control of white pine weevil and European pine shoot moth.--S. F. Potts, New Haven, reports that good control of Pissodes strobi Peck in an artificially infested tree was obtained by spraying with concentrated lead arsenate and lime sulphur, with a sticker and spreader added, whereas the ordinary spray concentrations were ineffective. Complete control of this weevil was effected by using both ordinary and concentrated spray mixtures of cryolite, with linseed oil or fish oil as a sticker and a spreader added to the mixture. Derris resinate also gave complete control but its use would probably be limited because of its high cost. In connection with studies on the control of the European pine shoot moth by the use of insecticides, Mr. Potts observed that practically all of the infested lateral shoots of red pine produced male moths, while over half of the infested terminals yielded females. Mr. Potts suggests as an explanation that there is apparently an insufficient quantity of food in the laterals for the female larvae which are considerably larger than the males. Mr. Potts reports that seven woodland plots were sprayed from an autogiro at Whitesbog, N. J., on June 23. Concentrated spray mixtures used in these tests contained lead arsenate, calcium arsenate, bordeaux mixture, derris, and lime sulphur. Fish oil and paraffin oil were tested as adhesives. Two kinds of spreaders and wetting agents were tried. Leaf collections were made for chemical analysis. These experiments were conducted in cooperation with C. W. Collins and R. R. Whitten, of the Morristown, N. J., laboratory.

Elm bark beetle as vector of Dutch elm disease.--R. T. Webber, of the Morristown, N. J., laboratory, reports concerning an experiment that he conducted with the native elm bark beetle (Hylurgopinus rufipes Eich.) as a vector of the Dutch elm disease fungus. This experiment was suggested because of the fact that the beetles hibernate in tunnels in the bark of living elm trees. If such beetles are contaminated with the fungus and reach the xylem in the course of their activities the trees might thus become diseased. Four elm trees from 3 to 4 inches D.B.H. were brought from Middletown, N. Y., in September 1936 and transplanted in a large cage in the laboratory yard. One thousand H. rufipes adults artificially contaminated with the fungus were confined to the trunk of each tree in cloth sleeves on September 30. All four trees showed external symptoms of the disease after foliage appeared in 1937 and were later confirmed as affected. The bark was subsequently removed from the trunks of the trees and numerous points where the beetles had contacted the xylem were found. Most of these contacts were made in the fall of 1936 but a few were probably made during the warm days of the winter or the early spring of 1937. As the Dutch elm disease fungus has been cultured this year from H. rufipes adults taken from their hibernation tunnels in the field, and as instances have been noted in the field where the xylem was contacted, apparently by the adults, the results of Mr. Webber's experiments are of particular interest. H. rufipes may be a more important vector of the Dutch elm disease fungus than has heretofore been supposed.

Parasitization of fall cankerworm.--The Morristown laboratory has cooperated with the National Park Service in connection with spraying work which the latter has done in the Morristown National Historical Park. The spray material was applied for the control of cankerworms by means of an autogiro. An undetermined egg parasite was found to have reduced the emergence of Alsophila pometaria Harr. in the Park. C. H. Hoffmann collected 1,935 egg masses from which neither larvae nor parasites had issued. These were placed in a container at the laboratory and later examined with the following results: Total number of eggs, 15,383; larvae issued from 3,871 eggs (25.1%); parasites issued from 6,289 eggs (40.8%); and from 5,223 eggs (33.9%) neither larvae nor parasites issued. The fact that neither larvae nor parasites issued from 33.9 percent of the eggs may have been due to the unnatural conditions under which the eggs were kept in the laboratory. C. L. Griswold, of the Morristown laboratory, took random samples of cankerworm larvae from various more or less isolated trees in the vicinity of Morristown to ascertain what species was present. The results are as follows:

Food plant	Larvae issuing	
	A. pometaria	Paleacrita vernata
	Number	Number
Elm	192	460
Wild cherry	83	38
Apple	71	37
White ash	41	0
Linden	194	0
Oak	423	3
Hickory	67	0

The results indicate that, although A. pometaria occurred on all the food plants mentioned, Paleacrita vernata Peck showed a preference for elm, wild cherry, and apple. The locality was apparently not responsible for the difference, as most of the collections were made in two restricted areas.

Insect outbreaks reported.--The forest tent caterpillar outbreak, which has been in progress in northeastern Minnesota since 1932, was very severe again this season, according to reports from L. W. Orr, of the Milwaukee, Wis., laboratory. In 1936 the larvae starved in a number of rather large areas because they had caused complete defoliation of the affected aspen and birch stands before they reached maturity. These areas had very few larvae present in 1937. The more recently infested sections where the population had not reached such a high point in 1936 were heavily infested this year and were completely defoliated. Bureau employees gave general technical supervision to a large amount of spraying work conducted by the Federal Forest Service on the Chippewa and Superior National Forests. Large power sprayers were used to spray limited areas around camp grounds, resorts, ranger stations, C. C. C. camps and other places where protection was especially needed. Effective control was obtained by using lead arsenate, with raw linseed oil added as a sticker. Present conditions indicate that the outbreak will continue another year.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

General woodland spraying begun.--Large-scale spraying of woodland areas was commenced on June 1 in Massachusetts, Connecticut, New York, and Pennsylvania. Two sprayers were also operated east of the barrier zone in Vermont, treating high elevations that threatened the zone area.

Spraying not completed on total acreage planned.--It was not possible to spray as great an acreage as had been planned, because of the unusual amount of rain that fell during the gypsy moth spraying season. Spray mixture does not adhere well to the wet foliage of underbrush unless there is a good circulation of air. Spraying under such conditions can be efficiently done only in areas where most of the underbrush has been removed or where underbrush failed to develop, and some material must be used to stick the spray material to the foliage. Without the use of fish oil as an adhesive, much of the poison would have been washed to the ground before any benefit had been derived. Workers patrolling burlap bands in areas where the infestation was relatively heavy prior to spraying report very few living caterpillars under the bands a day or two after such treatment.

Spraying suffers from lack of experienced men.--In some localities where men experienced in gypsy moth spraying were not available it has been necessary to train inexperienced men in the methods of dragging hose through the woods, in holding the nozzle, and in operating the sprayers. There is a marked difference between the quality of work performed by inexperienced labor and that done by men who have had at least one season's experience in spraying wooded areas. The position of nozzleman is especially important and the results obtained depend, to a considerable extent, on his ability to do his work well. It is often necessary to try out several workers in order to find a reasonably satisfactory nozzleman.

Field work hindered by maturing hay and grain crops.--Hay and grain crops in the gypsy moth infested region are fast reaching maturity, and the workers assigned to duty patrolling burlap bands and scouting trees in open country are finding it difficult to reach the trees without damaging the crops. Most of the hay and grain will be cut during the next few weeks.

Former members of thinning crews most adaptable for spraying work.--Spraying work is done largely by W. P. A. workers who have been transferred from other gypsy moth control activities for the short period when spraying is practicable.

All sprayers in the field visited periodically by skilled mechanics.--Several mechanics from both the Greenfield, Mass., and Wilkes-Barre, Pa., storehouses were detailed to the field to visit all sprayers in operation, make any adjustments or minor repairs necessary, and instruct the men in the proper handling of the machines. In this way loss of time due to mechanical difficulties is kept at a minimum.

Foliage sprayed in 1936 still retains arsenate of lead.--The employee supervising spraying work in the vicinity of Blandford, Hampden County, Mass., where a large percentage of the undergrowth is laurel, reports that, in recently walking through an area sprayed in June 1936, he saw evidence of arsenate of lead remaining on the foliage from last year's treatment.

Scouting completed on islands in Lake Champlain.--Scouting of the numerous small islands in the Vermont section of Lake Champlain was completed on June 30 and no gypsy moth infestations were found. The islands range from an area of only a few acres with a limited number of trees to islands of approximately 300 acres with dense tree growth. The tree growth on many of the smaller islands was nearly 100 percent white cedar, which is unfavorable for the development of the gypsy moth. Much of the growth on the larger islands was hardwood, the predominating species being elm, poplar, and oak, and many of the individual trees were enormous. A small motorboat with a licensed pilot was hired to transport the workers. The unsheltered islands were scouted on good days, and on days when the waters were rough and dangerous work was performed, if possible, on islands in bays and in other protected locations. Gypsy moth employees have observed many nests of sea gulls and wild ducks, particularly on the smaller islands not used for recreational purposes.

Water plentiful for spraying but biting insects annoy workers.--An adequate supply of water for spraying work has been available in most of the territory in New England where such work was being performed, owing to the heavy rains that fell in this area during May and to frequent thunderstorms. However, the surplus water gathered in swampy areas, resulting in an abundance of mosquitoes, which attacked the workers employed in woodland spraying and scouting for the gypsy moth, especially in the lowlands. The annoyance became so pronounced in an area near Lake Dunmore in Salisbury, Vt., that work had to be temporarily discontinued.

Emergency spraying in Berkshire County, Mass.--During the latter part of June several gypsy moth caterpillars were found under burlap bands in Sheffield, Berkshire County, Mass., where a single egg cluster was located during the scouting season in rough ledgy country. Arrangements were made to transfer a machine from Connecticut during the last 2 or 3 days of the month in an effort to completely eradicate this infestation. An area of 24 acres in the region where the caterpillars were found was thoroughly sprayed.

Shortage of workers impedes gypsy moth spraying in Connecticut.--It has been impossible to obtain the full quota of relief workers requisitioned for spraying work in some parts of Connecticut, in Litchfield County in particular. It has been necessary to shift workers daily from one spraying crew to another in order to equalize the number of men in the crews and to keep the sprayers in operation. Two sprayers were transferred from Connecticut to Massachusetts and two to Pennsylvania, where relief labor was available and where spraying was urgently needed.

Spraying in New York.--While some time was lost due to rain, good progress was made in the spraying work being carried on in Ulster and Putnam Counties, N. Y., and workers patrolling burlap and tanglefoot bands reported a marked decrease in gypsy moth larvae in areas where spraying had been done. Spraying was completed at a small infestation recently located in the town of Amenia, Dutchess County, and at another in Chatham, Columbia County.

Long hose lines used in Pennsylvania.--The topography of the gypsy moth infested territory in Pennsylvania is very mountainous and much of it is heavily wooded. It is sometimes necessary to repair abandoned roads, old wood roads, and trails in order to locate the sprayers at an adequate water supply. The infestations are often at a considerable distance from the nearest water and in places not easily reached. At one location the spray hose was suspended from a wire cable attached to trees on either side of the Lehigh River for a distance of approximately 150 feet, so that a serious infestation could be sprayed. One hose line 12,000 feet in length was operated in Kidder Township, Carbon County. This is the longest hose line so far used in the work. Numerous other hose lines in this region range from 1 mile to more than 8,000 feet in length.

Spraying in Lackawanna and Susquehanna Valleys expedited by water company.--The Spring Brook Water Company has cooperated with this activity to the fullest extent by supplying water from their hydrants for spraying residential areas in the Lackawanna and Susquehanna Valleys in Pennsylvania, and has permitted water to be taken from the streams and reservoirs owned or controlled by the company in order that several serious infestations in woodlands might be sprayed.

Corn borer project loans 16 sprayers for gypsy moth work.--Two spraying machines belonging to the corn borer project and loaned for gypsy moth work arrived in Wilkes-Barre, Pa., on June 11. They were driven over the road from Cleveland, Ohio, and made a total of 16 sprayers loaned to this activity by the corn borer project this year.

Notices of treatment issued in Pennsylvania.--Up to the middle of June 85 State department of agriculture notices of treatment for control of the gypsy moth had been issued by the State representative to property owners who had refused to sign Federal permits for spraying needed on their properties. These properties will be sprayed under the direction of the State representative at the expiration of the 5-day interval provided in the notice, if treatment work has not been done by the property owners concerned. More than 4,000 Federal permits to spray were obtained in this area.

All gypsy moth work temporarily suspended.--All spraying work was discontinued and the spraying machines and hose were washed and returned to the various storehouses by the end of June. The services of all workers were terminated when the maximum hours for the month had been worked, as no definite information had been received concerning W. P. A. or regular appropriation funds for use during the fiscal year 1938. As soon as the Gypsy Moth

Office was advised that funds were available for work during July, approximately 1,900 workers employed on this activity during June were notified to report for duty on the morning of July 6.

Nearly 6,000,000 new egg clusters creosoted in New England by C. C. C.--The creosoting of gypsy moth egg clusters was discontinued early in June. Since the first of July last year, C. C. C. enrollees have treated over 5,900,000 new egg clusters. Of these, approximately, 5,486,000 were creosoted in Massachusetts, 80,000 in Connecticut, 124,000 in Vermont, and 209,000 in New Hampshire. Federal gypsy moth work in New Hampshire has been discontinued.

Close Federal supervision of C. C. C. gypsy moth work maintained.--A representative of the Federal Gypsy Moth Office visited C. C. C. gypsy moth work at 24 colonies in Vermont, 18 in Massachusetts, and 14 in Connecticut during the first week in June. Burlap had been applied to the trees at most of these colonies. No previous work had been done at some of the places visited and extremely heavy infestations were present, but the caterpillars were much less abundant at other locations where thinning, cleaning, and creosoting work had been done during the winter.

The brown-tail moth project.--The brown-tail moth project was terminated at the end of June and all the crews were dismissed at the end of the working period. The crews in Maine, New Hampshire, Vermont, and Massachusetts had been engaged during the month in the elimination of old apple, wild cherry, and other favored food plants.

PLANT DISEASE CONTROL

Barberry bushes destroyed on 31 properties in South Dakota.--Although the number of barberry bushes removed in South Dakota is small in comparison with States farther east, survey work since W. P. A. funds became available in 1935 has resulted in the eradication of nearly 1,000 bushes on 31 different properties. According to G. W. Eade, in charge of the work in this State, survey has been confined largely to areas where bushes had been located in previous years. Much of the river territory and timbered areas bordering lakes has been surveyed, and 2,734 square miles of territory in 15 counties have been covered.

Stem rust damage to winter wheat.--With most winter wheat harvested, a summary of rust observations made during the past 6 weeks shows that considerably more than the normal amount of stem rust developed in the winter wheat area this year. Stem rust occurred in damaging quantities in eastern Kansas, eastern Nebraska, throughout northern Missouri, central Indiana, and central and northern Illinois. The extent of loss has varied widely, depending on local weather conditions, particularly on the amount of moisture present during the critical stage in the development of the crop. The greatest damage to winter wheat probably occurred in the western half of Missouri, western Illinois, central Indiana, and western Iowa. Serious damage was reported in some fields in southern and eastern Nebraska; however, early crops matured without appreciable damage and the heaviest losses were noted in the more susceptible soft-wheat varieties. In many localities good yields are reported, even though rust was abundant at harvest, indicating that the crop was practically made before the rust became prevalent.

Stem rust in the spring-wheat area.--On July 11, according to telegraphic reports from E. C. Stakman, St. Paul, Minn., heavy rust was present on spring wheat as far north as Fargo, N. Dak., particularly on Marquis, Reward, and Ceres. The amount of rust damage will vary widely, depending on the stage of maturity of the crop on July 10 and on moisture and temperature conditions.

Rust spreads from barberries to oats in Pennsylvania.--L. K. Wright, in charge of barberry eradication in Pennsylvania, reports that stem rust on oats in that State appears to be confined largely to direct spreads from barberry bushes. On July 10 he reported that there was considerable variation in the severity and prevalence of stem rust on oats, depending on the distance from barberry bushes. In Centre, Huntingdon, Wayne, Wyoming, Lackawanna, and Susquehanna Counties stem rust has not spread farther than the fields immediately adjacent to bushes. In Crawford and Erie Counties rust may be found for a distance of about 3 miles from the known limits of the barberry areas. According to Mr. Wright, there will be heavy damage in many fields of both wheat and oats where infected barberry bushes are nearby.

Blister rust control in the sugar pine region.--Five additional blister rust camps were established in California during June--three on the Eldorado National Forest and two on the Stanislaus National Forest--making a total of eight camps now in operation in the State. Eradication work was carried on in three National Forests--the Sierra, Stanislaus, and Eldorado--with a total of 1,057,827 Ribes being removed during the month from 6,110 acres, with 7,755 man-days of labor. Fairly good work is being done by the W. P. A. labor. A number of experienced men have returned and are of considerable assistance in breaking in new men and keeping crew rework to a minimum. Many of the men who report for work lack proper clothing and shoes for woods work. Fine cooperation was displayed by both W. P. A. and S. R. A. officials relative to the assignment of laborers, which greatly facilitated the movement of men to blister rust camps. In Oregon eradication work was carried on in the Rogue River operation, a total of 171,499 Ribes being eradicated from 3,224 acres with an expenditure of 1,045 man-days of labor. The quota of 115 employees for this operation was not reached until June 15. Rain made field work practically impossible on 16 days of the month. The latter part of the month was devoted to rework of 1934 and 1935 eradication areas.

Phenological data.--The first blister rust aecia observed this season in Michigan were seen on May 1 in Newaygo County; in Wisconsin on May 9 in Shawano County; and in Minnesota on May 20 in Isanti County. The first uredinia were observed on May 24 in Isanti County, Minn., on Ribes hirtellum. Fruiting and immature cankers were reported in Maryland on May 4, 7, and 13 and by the 19th of May aecia had been found at several locations in Garrett and Allegany Counties. The State leader from Virginia reports that blister rust in the aecial stage was found in May on three pines on the ridge of the Shenandoah and Tearjacket Mountains, at the Augusta-Highland County line. One had 8 infections, one 7, and one 3. Four of the infections were in the active aecial stage. The first aecia reported for the season in Virginia were seen on March 25.

Ribes eradication in the Northeast.--During the month of May, Ribes-eradication work was performed in the Northeastern States under four programs--E. C. W., W. P. A., A. R. A., and regular. As a result of 28,296 man-days of work by 2,470 laborers, a total of 94,939 acres were cleared of 2,380,948 currant and gooseberry bushes. The activities under the E. C. W. program gave employment to 1,703 enlisted men and 115 technical foremen and checkers from 80 C. C. C. camps, whereas on the W. P. A. program an average of 671 men worked 7,771 man-days.

COTTON INSECT INVESTIGATIONS

Toxicity tests against adults of Naupactus leucoloma Boh.--H. C. Young and G. D. Green, Florala, Ala., report the results of toxicity tests conducted during the first half of July. In cage tests on cotton plants, 86 hours after the insecticides had been applied, the beetle mortality was as follows: Calcium arsenate dust, 86 percent; commercial mixture of 75 percent calcium arsenate and 25 percent paris green, 84.8 percent; arsenate of lead dust, 53.3 percent; paris green spray (1 lb. to 50 gal. water), 36.4 percent; mixture of 1 part paris green and 10 parts lime, 20.9 percent; untreated check, 2.17 percent. In laboratory tests, 75 hours after the application of insecticides, the beetle mortality was as follows: Calcium arsenate dust, 100 percent; paris green spray (1 lb. paris green, 4 lbs. lime, and 50 gal. water), 100 percent; commercial mixture of 25 percent paris green and 75 percent calcium arsenate, 96 percent; calcium arsenate spray (4 lbs. to 50 gal. water), 84.6 percent; arsenate of lead dust, 76 percent; mixture of 1 part paris green and 10 parts lime, 69.1 percent; arsenate of lead spray (4 lbs. to 50 gal. water), 64 percent; mixture of 1 part cube (5.66 % rotenone) and 5 parts sulphur, 4 percent; untreated checks, 4 percent. Mr. Young also reports concerning field-cage toxicity tests conducted by Mitchell Wilkins, county agricultural agent of Walton County, Fla. Ninety-five hours after the insecticides had been applied, the beetle mortality was as follows: Calcium arsenate dust, 80 percent; sirup mixture (½ gal. water, 1 gal. sirup, and 1 lb. calcium arsenate) mopped on plants, 63 percent; mixture of 1 part calcium arsenate and 10 parts lime, 44.4 percent; mixture of 1 part paris green and 10 parts lime, 17.9 percent; untreated check, 4 percent.

Abundance of Naupactus leucoloma Boh.--Messrs. Young and Green also report that on July 14 one man in 4 hours collected 4 gallons of the beetles from ½ acre of cotton. It was estimated that there were 20,000 beetles per gallon, or that 80,000 beetles were collected, or at the rate of 160,000 per acre. As the bag-and-hoop method was used for collecting the weevils shaken from the plants and only about two-thirds of the beetles were captured, they were present at the rate of about 240,000 per acre. There were about 2,500 plants on the ½ acre, thus the average catch per plant was 32 beetles. This collection was made 1 mile west of Lockhart, Ala. This cotton field probably had more beetles than any other field, but the collection was not made in the most heavily infested portion. Actual counts have shown as many as 250 beetles on one plant.

Pink bollworm parasites.--L. W. Noblè and W. T. Hunt, Presidio, Tex., reporting on parasites of the pink bollworm, state that practically all of the overwintering Chelonus blackburni Cameron emerged during April and May. The emergence of this species was considerably later than that of the other species of parasites and was much better synchronized with the pink bollworm emergence, as eggs of the pink bollworm were available at that time on cotton for oviposition. During May and June, 92,000 Chelonus adults were liberated in the early cotton fields of the Presidio Valley, 20,000 were shipped to Puerto Rico, and 3,000 were shipped to Egypt. A shipment of 10,000 larvae of Exeristes roborator Fab., which had been brought through the winter in cold storage, was also sent to Puerto Rico for release.

Emergence of pink bollworm moths.--The emergence of pink bollworm moths from overwintering larvae, in several series of experiments to determine the factors influencing the survival, are reported on by A. J. Chapman and associates, of the Presidio laboratory. In comparable hibernation cages the moth emergence this year from overwintering larvae in bolls was 10.98 percent, as compared to 6.29 percent in 1936. The survival was only 0.47 percent in larvae that spun cocoons in the soil. It is believed, however, that the difference in survival would not be as great under natural conditions as indicated and that the technique used in obtaining a large number of larvae to spin cocoons in the soil of a small area under cages was responsible for a considerable part of the difference. In tests comparing the effect of depth of burial on the survival, the emergence from the two types of material was as follows: Larvae in bolls at 2-inch depth, 23.23 percent; at 4-inch depth, 7.28 percent; at 6-inch depth, 2.66 percent; larvae in cocoons at 2-inch depth, 0.91 percent; at 4-inch depth, 0.45 percent; and at 6-inch depth, 0.03 percent. When computed on the basis of total moth emergence, of the 5,490 moths that emerged from the bolls buried at the three depths, 70 percent came from bolls buried 2 inches; 22 percent from the 4-inch depth; and 8 percent from the 6-inch depth. After the material was buried in the cages it was not disturbed, as material would have been in fields that were planted and cultivated. The experiment shows, nevertheless, that deep burial is an important factor in reducing survival. To determine the effect of cultivating following a spring irrigation, larvae in bolls were buried 6 inches deep. As soon as the soil dried sufficiently to be worked, following the irrigation on March 15, it was stirred to a depth of approximately 3 inches until the soil cracks were filled and a mulch was created. A total of 92 moths emerged from the cultivated cages and 24 from those not disturbed. The results suggest that the cultivation enabled the larvae to work their way nearer to the surface for pupation, thereby increasing the survival. In comparing the effectiveness of one and two winter irrigations and a spring irrigation following winter burial, it was found that when the larvae were buried in December two winter irrigations were much more effective than one in reducing survival, but there was no significant difference in the number surviving from the one and two irrigations of bolls buried in January. Approximately 7 inches of water was applied in all irrigations. The tests on the influence of the time of winter burial and winter irrigation on survival showed that more moths emerged from bolls buried and irrigated in February (447 moths) than when buried and irrigated in December (312) or January (315). However, when the bolls were buried in December but not irrigated until March 15 the reverse was true, as 1,046 moths emerged from the bolls buried in December, as compared to 392 moths from those buried on March 1. These experiments corroborate previous tests that if fields are to be plowed and irrigated for winter crops, this should be done early in the winter, to be most effective for pink bollworm control; but if the fields are plowed and left without irrigation until spring, postponing the plowing until late in the season (March 1) is more effective. In tests on the effect of the date of a spring irrigation on time of emergence, 52 percent of the moths had emerged by May 5 from cages that were irrigated on March 10, 32 percent from cages irrigated on April 1, and 2.23 percent from cages irrigated on April 20. Thus the delay in spring irrigation tended to delay moth emergence. The early irrigations also tended to scatter the emergence over a longer period, and delaying the irrigation tended to bunch the emergence. In all of the tests with larvae in bolls buried 6 inches deep the lowest survival (1.2 %) occurred in larvae buried on December 1 and followed by two winter and a spring irrigation (December 15, January 15, and March 15), and the highest survival (13.1 %) from larvae buried on December 1 and not irrigated until March 15.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Wild-cotton eradication.--The eradication of wild cotton in southern Florida went forward as usual during June, but with a considerable reduction in the number of laborers employed. Weather conditions were favorable and particular attention was given to locations where there was a possibility of cotton fruiting before the next clean-up. A large number of small seedling plants, which had just come up as a result of early rains, were removed in the Key West area. In the upper west-coast counties practically all of the locations were worked a second or third time. These areas are nearest to cultivated cotton, and for the last several years no wild cotton has been allowed to reach the fruiting stage. All eradication work was discontinued at the end of June. During the month a first clean-up was made on about 4 acres in Collier County, from which 692 mature and 2,057 seedling plants were removed. In the area recleaned 56 mature, 35,970 seedling, and 73 sprout plants were removed. During previous clean-ups a good many wild cotton bolls had been inspected, to get an idea of the condition of infestation. During the last season's clean-up it was decided to preserve samples of green bolls from various locations and inspect them during July and August. This work is now getting under way at Miami. Approximately 700 bolls were inspected as plants were being destroyed and 32 specimens of the pink bollworm were found. These all occurred on several keys off the coast of Monroe County.

Thurberia-plant eradication.--The eradication of Thurberia plants in the Santa Catalina Mountains of southern Arizona went forward throughout the month from the camp in Romero Canyon. A total of 1,260 acres was covered and 3,427 Thurberia plants were destroyed. Early in the month it was evident that all of the area readily accessible from this camp would be completed by the end of the month, and a new camp site had already been located. There was a plentiful supply of water but this had disappeared when it came time to move the camp. As soon as the summer rains begin there will be plenty of water at the new site and the camp will be established as soon as possible. In the meantime the crews are reworking the Tortillita Range to remove any seedling plants that have come up since this range was first worked.

Laboratory inspection.--The inspection of green-boll samples collected outside of regulated areas was continued at the San Antonio laboratory during June. The results were all negative. At a number of field stations green bolls or bollies are being inspected, these samples having been collected within the regulated areas. The samples are, of course, all inspected in the area in which they were collected. A few specimens of the pink bollworm were found but these did not involve any counties in which specimens had not previously been found during the 1936 crop season.

Lower Rio Grande Valley of Texas.--The first bale of the cotton crop is always produced in the lower Rio Grande Valley of Texas. This year it was ginned on June 14.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Survival of the pea weevil in the Northwest.--Data submitted by T. A. Brindley and F. G. Hinman, of the Moscow, Idaho, laboratory, show that a relatively small percentage of Bruchus pisorum L. were able to survive a minimum temperature of -16° F. in the Palouse area of Idaho and Washington, during the winter of 1936-37, when enclosed within hibernation cages in situations unprotected from the elements, but that they failed to survive a minimum temperature of -30° in such situations. In one series of experiments the pea weevils were exposed in small, wooden hibernation cages at nine locations in the Dayton, Wash., pea-growing area during October 1936. At each location two hibernation cages were nailed to the base of the post, two cages were nailed to the top of the post, and two cages were placed in a wooden shelter open at the bottom and nailed to the top of the post. The minimum temperature recorded at Dayton during the winter of 1936-37 was -16°. Upon examining the weevils in this series in May 1937, it was found that the individuals in the cages at the bases of the posts, where they were protected from snow during the greater part of the winter, suffered the least mortality, such mortality ranging from 31.1 to 97.7 percent, with an average of 67.3 percent. Most of the weevils were dead in the cages nailed to the tops of the posts, where they were exposed fully to the elements, the average mortality being 97.7 percent. In the cages placed in wooden shelters at the tops of the posts, where the weevils were protected partially from the weather, the average winter mortality was 88.8 percent. At Moscow, Idaho, where the hibernation cages containing weevils were placed in a kiosk, exposed to changes in temperature but excluding rain and snow, a small percentage of the weevils survived a minimum temperature of -16°, but none of them were found to be alive following the night when the temperature dropped to -30°. The results from a series of hibernation cages containing weevils placed at progressively higher elevations on Moscow Mountain (2,750, 3,150, 3,650, 4,050, and 4,750 feet, respectively, above sea level), showed that some of the weevils survived at all elevations when the cages were covered with snow, except in the cages placed at the 2,750-foot elevation. The minimum air temperature at this elevation was -21°, while the corresponding minimum temperature at the 3,650- and 4,050-foot levels, was -8.0° and -10.5°, respectively.

Naphthalene not effective as a soil fumigant for wireworms in South Carolina.--Judging from the results of a preliminary experiment performed at Charleston, S. C., by K. L. Cockerham of the Biloxi, Miss., laboratory, it appears that under the conditions encountered in this experiment, naphthalene is not effective as a soil fumigant against the species of wireworms which in recent years have caused severe damage to Irish potatoes in certain districts of the South Atlantic coastal plain. The principal species involved were the gulf wireworm (Heteroderes laurenti Guer.) and the sand wireworm (Horistonotus uhlerii Horn). Crude naphthalene was mixed with the soil of the experimental plots in October 1936, during the operation of plowing, at the rate of 800 pounds to the acre, using the same dosage and methods that have given satisfactory control of wireworms, principally of the genus Limonius, in the irrigated lands of the Pacific Northwest. The experimental plots were located in a wireworm-infested field, classified as Norfolk sandy loam, that had been planted to potatoes in 1936 and which was intended for potato planting in 1937. The potatoes were harvested from this land early in June and velvetbeans were broadcast about July 10. In addition to the velvetbean crop, the land supported a rank growth of weeds, so that a large quantity of green vegetation was plowed under during the process of mixing the naphthalene with the soil. The inclusion of such a large quantity of green vegetation in the soil with naphthalene has been shown, in experiments in the Pacific Northwest, to be unfavorable to the best efficiency of the fumigant. Sampling of the soil in the experimental plots approximately 2 weeks after the application of the naphthalene disclosed that there was no significant difference between the living wireworm population in the treated and untreated plots. The mean soil temperatures during this 2-week period averaged approximately 70° F. at a depth of 4 inches below the soil surface, such temperatures being satisfactory under ordinary conditions to induce favorable results from the fumigant. The potatoes from all plots were harvested on June 1, 1937, and it was found that there was no significant difference between the number and weight of tubers showing wireworm injury in the treated and untreated plots.

Duration of exposure important in evaluating efficiency of hydrocyanic-acid gas against cigarette beetle.--According to data obtained by W. D. Reed and E. M. Livingstone, of the Richmond, Va., laboratory, it appears that a wide margin of error may occur in evaluating the efficiency of fumigants, particularly hydrocyanic-acid gas, when used at relatively low temperatures in partial vacuum against such insects as Lasioderma serricorne Fab., infesting tobacco bales, when such evaluation is based on the percentage of mortality suffered by test insects removed from the fumigated article at the end of the exposure period. Recent experiments with well-grown larvae of the cigarette beetle in which 3.9 ounces of liquid hydrocyanic-acid gas were used per 1,000 pounds of tobacco gave a percentage of mortality ranging from 51.2 to 83.2 percent at the expiration of the exposure period of 4 hours in partial vacuum. In lots of cigarette beetle larvae left in the tobacco bales for 24 hours the percentage of mortality ranged from 67.2 to 82.4; for 48 hours, from 91.2 to 96.8; and at the expiration of 67 hours, it ranged from 90.4 to 100 percent. The temperature of the tobacco bales during the period averaged approximately 62° F. In order to further determine the residual properties of hydrocyanic-acid gas left in tobacco bales after fumigation in partial vacuum for 4 hours at a dosage of 3.9 ounces per 1,000 pounds of tobacco, test spikes containing cigarette beetle larvae were placed in bales of tobacco that had been removed from the fumigation tank after the customary aspiration or "air washing" of the tobacco bales had been applied. The examination of the test insects after 24 hours showed that the mortality ranged from 39.2 to 60 percent; at the end of 48 hours it ranged from 39.6 to 67.2 percent; and at the end of 67 hours, from 56.0 to 87.2 percent.

INSECTS AFFECTING MAN AND ANIMALS

Larvicide tests for control of subsurface-breeding mosquitoes.--W. V. King reports the following results of a few tests with paris green, calcium arsenite, and phenothiazine, on the killing of Culex larvae in storm-sewer catch-basins. The results are shown in the following table and it may be noted that a high percentage of mortality occurred in nearly all tests. The poorest results obtained were with the two arsenicals when applied as a dust. Paris green mixed with water was also tried on Culex larvae that were breeding prolifically in a grassy polluted ditch. The material was applied at the rate of about 2 pounds per acre, and practically 100 percent mortality occurred.

Material	Rate of application	Average larvae per dip	Kill
		Number	Percent
Phenothiazine:			
(one part in--	(Dilution)		
Penetrol - 20 parts---------	1-450,000	100	99
Acetone - 5 parts)--------	1-480,000	25	100
	(Pounds per acre)		
Paris green (dry)--------------	26	50	89
Calcium arsenite (dry)---------	26	50	70
	(Dilution)		
Paris green (wet)--------------	1-200,000	100	99
Do.--------------------------	1-200,000	20	100
Do.--------------------------	1-430,000	50	99 plus
Calcium arsenite (wet)---------	1-100,000	75	93
Do.--------------------------	1-140,000	10	100
Do.--------------------------	1-270,000	40	96

Pyrethrum for repelling sand flies from dwellings.--J. B. Hull, of the Savannah, Ga., laboratory, reports that practical tests of the repelling power of burning pyrethrum were made on porches and in dwellings. By keeping a heavy smudge of the smoke in the vicinity of the parties to be protected from sand flies, few bites were received, even when sand flies were numerous. As soon as the burning powder was extinguished, bites were received, although some smoke remained in the room and the odor was still very strong. Tests were made with a pyrethrum and oil mixture on 18-mesh window screen to see if it would prevent sand flies from passing through the screen. These tests were made in the laboratory and in the field. In the laboratory the screen was coated with the mixture, exposed for different periods of time, and then tested for its ability to prevent sand flies from passing through it. It was found that less than 1 percent of the sand flies would pass through a screen 24 hours after it had been treated with pyrethrum and oil. Screen of the same mesh coated with the oil alone was not so efficient.

Sodium cyanide in control of fire ants.--B. V. Travis reports the following results of preliminary experiments on the use of sodium cyanide in control of fire ants on Forshala Plantation, Fla.: (1) Dry egg cyanide, applied from 3-6 inches deep, is equally if not more effective than when applied as a liquid. The dry application is much cheaper to apply than the wet (solution). (2) Dry egg cyanide, applied 12-24 inches deep, does not prove so effective as the more shallow applications. (3) Better results with cyanide may be expected if the colonies are treated as early as March or April. At this time the colonies are more compact. (4) If a cyanide solution is used, better results are obtained by pouring the solution down the galleries instead of in holes punched in the colony.

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Sulphur promising as a dip for sheep tick.--O. G. Babcock, Sonora, Tex., reports that 325-mesh sulphur or the 5,000-mesh sulphur at the rate of 10 pounds to 100 gallons of water will kill all adults of the sheep fly (sheep tick) but not the pupae. The number of dippings and the interval between dippings cannot be definitely stated until the total pupal period has been definitely established. All evidence points to the fact that some of the pupae of the sheep tick (Melophagus ovinus L.) requires a period of from 42 to 50 days for the emergence of the adult tick.

Development of eggs of Aedes vexans Meig. and A. aldrichi Dyar and Knab in nature.--H. H. Stage, Portland, Oreg., reports that weekly out-of-door floodings of soil samples have shown that following a gradual seasonal rise in temperature, eggs of the above species first began to hatch on March 12. However, data accumulated by drying and reflooding such samples in the laboratory showed that by April 15 not more than 6 percent of such eggs were hatching. As time went on, it appeared that the percentage of hatch closely followed temperature variations until the maximum was reached on April 23, when 72 percent of the A. vexans and 67 percent of the A. aldrichi eggs hatched in the first flooding.

Irradiation of mosquito larvae.--Several tests were completed, Mr. Stage says, in which over 800 larvae of A. vexans and A. aldrichi were irradiated with varying amounts of ultra violet light. Data from these tests indicated that daily exposures of 10 minutes at a distance of 18 inches from the carbon arc was detrimental; that 5 minutes a day might be somewhat beneficial; and that 2 minutes was definitely, although only slightly, beneficial to the growth and health of the larvae. In the series of larvae which were irradiated for 2 minutes a day, 66 percent emerged as adults, while in the nonirradiated checks only 56 percent of the larvae reached the adult stage.

Mosquito eggs from nonfertilized females.--Mr. Stage also reports that 32 A. vexans females, which emerged from the pupal stage in separate containers, survived to take one or more blood meals and that 20 of them laid eggs. Of these, 16 laid 1 batch of eggs each; 2 laid 2 batches each; and 2 laid 4 batches each. The average number of eggs per batch was 27.5. The greatest age attained by any of these females was 78 days. The greatest number of blood meals taken by 1 female was 15. This female lived 70 days. A number of eggs laid by these females were dissected 1 and 2 months after having been laid, but none showed embryo development. Eggs also flooded with leaf infusion water gave no hatching. Four virgin A. aldrichi females took blood meals but none laid eggs. Partially developed eggs were found in two of these females when dissected after death. Thus, it is possible that this species is capable of laying eggs without being fertilized. Data indicating that virgin females lay eggs in nature was obtained in 1936, when A. vexans females captured in nature after a blood meal on a horse laid eggs in the laboratory. These eggs apparently were not fertilized, since the customary development of the embryo within the egg did not take place. At this time a large number of eggs were obtained from females caged after having taken blood meals, in which there was no embryo development. A 4-percent sample of 19,000 eggs so obtained showed that 37 percent contained no embryos.

Viability of A. vexans and A. aldrichi eggs.--A large quantity of soil containing such eggs was obtained in May 1935, according to Mr. Stage, and moved about 1 mile to a screened cage placed under natural out-of-door conditions above the normal flood contour. The eggs contained in this soil were laid during the summer of 1934 or earlier. Twelve samples of this soil are flooded each year on June 1 and September 1. The following average hatches per sample have been recorded:

Year	Larvae hatching in--	
	June	September
	Number	Number
1935----	370.0	174.2
1936----	232.8	34.0
1937----	62.5	--

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Eleven living larvae of the Mexican fruit fly (*Anastrepha ludens* Loew) were intercepted at Laredo, Tex., on April 1 in a sour orange in baggage from Mexico. An adult of the colydiid *Pseudobothrideres quadratifer* Heller was taken at Newport News, Va., on May 2 on a dao (*Artocarpus lakoocha*) log in cargo from the Philippines. The thrips *Frankliniella cephalica* (Crawf.) was intercepted at Miami, Fla., on April 21, on rose blossoms in baggage arriving by airplane from Colombia. An adult of the bruchid *Bruchidius histrio* Boh. was found at Washington, D. C., on January 15 with seed of *Lupinus* sp. in baggage from Turkey. H. S. Barber reports that this is new to the National Museum collection. A living specimen of the scale insect *Aspidiotus subcuticularis* Green was intercepted at San Francisco on March 25 on a pomelo in ship's stores from China. A living larva of the turnip gall weevil (*Ceutorhynchus pleurostigma* Marsh.) was taken at Philadelphia on May 4 in a rutabaga (*Brassica campestris*) root in ship's stores from Scotland. A living larva of the Asiatic rice borer (*Chilo simplex* Butler) was found at Baltimore on February 25 in rice straw in cargo from Japan. Living and dead adults of *Bruchidius villosus* F. arrived at Boston on April 16 in tree seed (*Laburnum alpinum*) in cargo from Austria. A living adult of the mango weevil (*Sternochetus mangiferae* F.) was intercepted at San Pedro, Calif., on April 17 in a mango seed in passenger's baggage from Australia. Living specimens of *Isochaetothrips reticulatus* Crawf. were taken at the airport at Brownsville, Tex., on January 4 on camellias in cargo from Mexico.

Pink bollworm from Cuba.--A living larva of *Pectinophora gossypiella* Saund. was intercepted at New York on March 26 in a cottonseed in baggage from Cuba. The lot consisted of one cotton boll and 15 cottonseed. C. Heinrich reports the specimen to be an abnormal larva of the pink bollworm.

Alfalfa weevil in moss packing from Germany.--A living adult of the alfalfa weevil (*Hypera postica* Gyll.) was intercepted at San Francisco on May 10, 1937, in sphagnum moss packing for *Amygdalus* cuttings in the mail from Germany. The packing also contained a slight admixture of forest litter but the package contained no plant material with which this weevil might be commonly associated. This interception offers a clue as to how this major pest of alfalfa may have made the jump from the shores of the Mediterranean to Utah sometime prior to 1904, when it was first reported in this country from near Salt Lake City.

Pathological interceptions of interest.--Albugo bliti (Biv.) O. Kuntze was intercepted for the first time on March 3 at New York on Amaranthus sp. from Cuba. Botrytis allii M. T. Munn was intercepted from the tropics for the first time on June 14 at Norfolk in onions from Straits Settlements. Ceratostomella fimbriata (E. & H.) Elliott was intercepted in sweetpotatoes from British Guiana on June 7 at Boston and in malanga roots from Dominican Republic June 9 at New York. Our first interception of Colletotrichum spinaciae E. & H. was made on April 13 at New York on spinach from Belgium. Elsinoe australis Bitancourt & Jenkins was intercepted at New York on May 14 and 22 on lemons from Paraguay. Our first interception of Gloeosporium apiosporium Sacc. was made on May 14 at New York on leaves of Arctostaphylos uvae ursi from Italy. Mycosphaerella stemmatea (Fr.) Rom. was intercepted from Sweden for the first time on June 8 at Seattle on Vaccinium sp. The first interception of Pestalozzia batatae E. & E. was made at Philadelphia on June 3 in sweetpotatoes from Japan. Pratylenchus pratensis (De Man) Filipjev was intercepted from Italy for the first time on May 19 in potatoes at Philadelphia. Phytophthora citrophthora (Sm. & Sm.) Leonian was intercepted on June 23 at Philadelphia in an orange from Spain. Sclerotium sp. producing minute black sclerotia in horseradish root was intercepted at New York on June 8 in material from Germany. The first interception of Septoria anthrisci Pass & Brun. was made at Philadelphia on May 15 in Anthriscus cerefolium from Italy. Septoria megaspora Speg. was intercepted for the first time on June 9 at New York on agave from Italy. Undetermined species of Sphaeronema were intercepted at New York on January 13 in dasheen roots from Azores and at Philadelphia on May 1 in potatoes from Germany.

DOMESTIC PLANT QUARANTINES

Sweetpotato weevil control project established.--With a regular appropriation made available in the new fiscal year, the organization of a project for the control of the sweetpotato weevil is under way. T. R. Stephens is designated as field leader, with headquarters at Room 7, Gates and Cook Building, Gulfport, Miss. Mr. Stephens has been working with the Bureau for a number of years in the control and prevention of spread of the Mexican fruit fly. The principal objectives are to determine the extent of spread of the weevil and to eradicate all isolated infestations in the lightly infested areas of the commercial belt. The project will be conducted in cooperation with State officials in plant-pest control, and will be carried on in Alabama, Georgia, Mississippi, Louisiana, Texas, and possibly Florida.

Joint project for control of two peach diseases.--Activities relating to the control and eradication of the phony peach and peach mosaic diseases have been combined and will be carried as a single project. A. E. Cavanagh is designated as project leader, with headquarters at Little Rock, Ark., as heretofore, C. H. Rothe acting as assistant.

Peach mosaic situation in California.--Waivers for tree removal were signed in June by 128 owners in the areas infected with the peach mosaic disease. Removing the diseased trees, estimated at 60,000, is the all-important job in the new fiscal year. The labor crews have accordingly been increased to 500 men for the California work. From San Diego County comes the report that peach mosaic has been found in 25 additional localities. New cases have also been found in the vicinity of the known infected areas of Riverside and San Bernardino Counties. A scattered chain of light infections therefore extends from within 4 miles of the Mexican border northward to the Hemet district in Riverside County.

Peach mosaic control activities in other States.--A serious infection center was brought to light in Bryan County, Okla., in June. Inspection is accordingly being conducted, in cooperation with the State, in the vicinities of peach nurseries in four Oklahoma counties. Work in other States thus far has included the inspection of certain areas in Indiana and Missouri, of 3 counties each in Colorado, Arizona, and New Mexico, 12 counties in Texas, and 13 in Utah. More inspection is to be done in these States. Diseased, abandoned, and worthless peach trees are being eradicated with funds allotted from emergency relief appropriations.

Phony peach disease under control.--Inspection for the phony peach disease was made in June by 63 Federal and 37 State inspectors in 219 counties in 13 States. Nursery inspection is completed in Alabama, Arkansas, Georgia, Illinois, Mississippi, Missouri, North Carolina, South Carolina, and Tennessee, and reinspection is now being made of properties found infected last year, with orchard inspection to follow. Control activities of the past 2 years have progressed to the point where the outer rim of infection is being pushed back and the intensity reduced at the center.

Relief work on phony peach disease reduced.--The tree-removal project is now confined to seven States, having accomplished its purpose in Illinois, North Carolina, Mississippi, and Louisiana. The force is being reduced to approximately 200 relief persons, a reduction of more than 65 percent. A larger number of trees is being removed per man than heretofore. During the life of the project, over 64,000,000 worthless trees have been removed from over 150,000 properties in 279 counties of 11 States.

Citrus canker on the decline.--The eradication of citrus canker is believed to have been accomplished in Jefferson County, Tex., according to a report from the field leader, R. N. Dopson. A third house-to-house inspection was recently made of the old infection center at Beaumont where over 500 diseased trees were found in the winter of 1935. The eradication of these diseased trees, as well as the abandoned and escaped citrus in the vicinity, has apparently been effective in checking the canker, as no such infection has been found in the area since May 1936.

Citrus canker activities.--The work of June marked the completion of inspection and tree-removal in Mississippi covering six counties and several outlying islands; the reworking, without finding canker, of areas in Texas and Louisiana that have long showed recurrent infections; the destruction of hundreds of valueless seedling orange trees in a noncommercial area in Texas, with the cooperation of the owners; and the working of new territory in Alabama and Florida. Several thousand acres of abandoned satsuma groves and abandoned trifoliata nurseries were recently found in Jackson County, western Florida, and 116 laborers have been assigned to remove the trees. Small crews of relief laborers are being continued in the fiscal year 1938 to work with inspectors and remove seedlings in the vicinity of old infection areas.

Transit-inspection activities.--With the seasonal decline in nursery-stock shipments, the principal articles being inspected are fruits, vegetables, cut flowers, and vegetable plants. At Chicago and other Midwest points special attention is given to refrigerator and produce cars from the areas heavily infested with Japanese beetles. No beetles have been found. Inspectors of the Bureau of Agricultural Economics at midwestern points are notifying transit inspectors daily of the arrival of any shipments of produce from the regulated areas and they have also provided information of assistance in organizing the inspection work. Within the infested areas transit inspection has been extended to the checking of shipments as to screening and covering of produce in transit, and also checking interdealer shipments as to certification requirements.

Interceptions in transit inspection.--During the month of June, over 78,000 shipments of restricted articles were inspected in transit at 12 stations, and 219 were intercepted as violations of quarantines relating to the gypsy moth and the Japanese beetle. A currant plant with the midsummer stage of the blister rust was recently caught at New York and prevented from going to a point in Kansas where white pines are grown extensively as ornamentals. Two shipments of live insects, mailed without permit, were found and reported to the responsible division. A transit inspector, while recuperating from a serious illness in New York, noted from his bedroom window that house plants were being brought into the apartment house, with household goods shipped from a foreign country. Investigation on the part of a port inspector disclosed that the plants had entered the country without permit, and they were accordingly confiscated.

White pine nurseries inspected.--Blister rust inspection has been conducted in the current field season in the environs of 61 nurseries growing 5-leafed pines, of which 15 are located in the Northeastern States, 14 in the Middle Atlantic States, 31 in the Middle West and Lake regions, and 1 in the Pacific Northwest. The zones inspected cover a radius of from 1,500 feet to a mile or more of the respective nurseries. The work is complete, except for three northern nurseries. Of special interest in the season's work were the conditions found at the Forest Service nursery at Haugan, Mont., where approximately 15 million 5-leafed pines are being raised for planting on Federal land in the Pacific Northwest. Ribes conditions around this nursery are more serious than any we have been called upon to inspect.

CONTROL INVESTIGATIONS

Insect blood-staining method.--It has been found by J. F. Yeager and J. B. Gross, of the Beltsville, Md., laboratory, that nicotine can be utilized effectively in the staining of smears of heat-fixed insect blood by the Wright technique. This nicotine modification of the usual Wright's procedure, called the Wright-nicotine-oxalic acid, or W-N-O procedure, involves diluting the Wright's blood stain with nicotine solution and later increasing the nuclear-cytoplasmic differentiation by means of oxalic acid. Most of the insect blood cell types stained in this way exhibit red nuclei and blue or blue-grey cytoplasms, which may contain various inclusions. This method is being utilized in a study of the blood picture of the southern armyworm (Prodenia eridania Cram.).

Biological disposition of rotenone after ingestion by southern armyworm.--P. A. Woke, Beltsville, reports on experiments made to determine the biological disposition of rotenone after ingestion by the southern armyworm and to determine whether any of the separate tissues of this insect might affect its toxicity. Rotenone was fed to larvae in sandwiches or was mixed with the larval tissues. Following this, after intervals of time, acetone extracts of the tissues and feces were prepared and tested against mosquito larvae for the determination of toxicity. The toxic action of rotenone for southern armyworm larvae is usually very slow and may not occur, even when excessively large doses are ingested. All or most of the rotenone ingested by the larvae is eliminated with their feces. The toxicity for mosquito larvae of finely powdered rotenone is not altered to a demonstrable extent after ingestion. The toxicity is not appreciably reduced during 18 hours of incubation in the dark at 29° C., with the various tissues and with the contents of the digestive tract.

Oxygen capacity of blood of southern armyworm.--Because the blood of many insects contains copper in rather large quantities, it has been suggested that all insect blood contains the copper-containing respiratory pigment, hemocyanin. F. H. Babers, Beltsville, has found that, although the blood of the southern armyworm contains approximately 4.9 mg of copper per 100 ml, the oxygen capacity of this blood is slightly less than that of physiological salt solution. It is quite improbable, therefore, that the blood of the southern armyworm contains hemocyanin or any other compound in sufficient quantity to act as a respiratory pigment.

Tests of high-pressure sprayers.--In cooperation with the Division of Gypsy and Brown-tail Moth Control, final tests of high-pressure sprayer units were conducted at Greenfield, Mass., from June 25 to 30, inclusive, and at Wilkes-Barre, Pa., from July 8 to 12, inclusive, under the direction of A. G. Galloway. These machines represent a group similar to the units acquired in 1936 and manufactured by the same company. Acquisition of them makes available to the gypsy moth activities a total of 22 machines capable of developing pressures up to 1,500 pounds per square inch and able to pump 40 gallons of spray mixture per minute at 1,000 pounds' pressure per square inch. Under the same cooperative agreement, a program of modernizing and conversion has been inaugurated at Greenfield, which involves the salvaging of high-pressure spray pumps, together with all possible piping, valves, and other accessories from 10 of the sprayer machines purchased in 1927. These machines are mounted on 3-1/2-ton Federal truck chassis. The purpose of this program is two-fold in that it will eliminate a number of automotive units which have become obsolete, insofar as availability of parts is concerned, and it will result in more efficient sprayers from the viewpoint of spray pump performance. The work involved in this program is expected to continue over a period of several months.

BEE CULTURE

What is a lethal dose?--L. M. Bertholf, of Western Maryland College, working as agent for the Division of Bee Culture under a cooperative agreement, reports that apparently almost any dose of lead or calcium arsenate may be considered a "lethal" dose for honeybees. He and his students have found that a single dose which contains as little as 0.00000005 grams of the element arsenic may cause a perceptible shortening of the insect's length of life, as compared with unpoisoned controls, while a dose of 128 times this amount usually causes no apparent effect within 24 hours. It seems that, even though arsenic may not kill the bee at once, it probably injures it in some way so that the effect becomes noticeable weeks or even months after it is eaten.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Identity established for a lepidopteron feeding on green corn.--In shipments of green corn from Mexico, the quarantine inspectors of the Bureau have found on several occasions a small phycitine larva feeding in the corn grains. This caterpillar resembles that of Ephestia cautella Walk. and could be distinguished from it by little else than its larger size (when full grown). Recently we received from Brownsville, Tex., two moths reared at Matamoros, Mexico, from similar larvae. They have been identified by Carl Heinrich as Moodna bisinuella Hampson, a species close to, but distinct from Moodna ostrinella Clem., which occasionally attacks corn in the United States. M. bisinuella is a Mexican species not known to occur in this country. Until the present rearing, nothing was known of its larvae or life history.

New record of prey used by vespid wasp.--Specimens of Symmorphus debilis (Saussure) and prey, the latter removed from burrows of the wasp, were recently submitted by M. G. Perrow, director of public welfare, Lynchburg, Va. The wasp was determined by Grace Sandhouse, and the prey was identified by A. G. Boving as Chalepus sp., a leaf-mining locust beetle of the family Hispidae. In previous accounts of its habits, the prey of this wasp was said to consist of the leaf-mining caterpillar Antispila nyssaefoliella Clem.

Turtle killed by sarcophagid larvae.--Recently C. T. Greene received from G. M. Greene, of Harrisburg, Pa., a turtle which had died as the result of infestation by parasitic dipterous larvae. Twenty-one full-grown larvae were removed from the turtle and there were numerous others that had not matured. Mr. Greene identified the larvae as those of Sarcophaga cistudinis Ald.

Botfly taken from a cat.--A second-instar dipterous larva removed from the neck of a cat at Fairfax, Va., June 28, 1937, was submitted for identification and has been determined by C. T. Greene as Cuterebra sp., probably C. cuniculi Clark. Presumably the infection resulted from eating a young rabbit. The case is interesting because of the very few records of the occurrence of botfly larvae in cats.

New distributional record of an ephydrid breeding in salt water.--Specimens submitted by G. N. Wolcott and reported as breeding in large numbers in the Ensenada Salt Ponds, Puerto Rico, have been identified by D. G. Hall as Ephydra gracilis Pack. This species, which sometimes occurs in enormous swarms, was first described from material breeding in Great Salt Lake, Utah. This is the first record of the species from tropical America.

A new species of chigger from Maryland.--Six partly engorged chiggers were taken last April by A. B. Gurney, of this Bureau, from a hibernating specimen of the blue-tailed skink found near Priest Bridge over the Patuxent River. H. E. Ewing has concluded that these specimens represent an undescribed species in the genus Trombicula, and has drawn up a description for publication.

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